14/09/2022

RM-G2
CODE-B

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

MM : 720

FORTNIGHTLY TEST SERIES

Time : 3 hrs. 20 min

(*for* NEET-2023)

Test – 3

Topics covered :

Physics : Work, Energy and Power

Chemistry : Chemical Bonding and Molecular Structure, States of Matter: Gases and Liquids

Botany : Biological Classification, Morphology of Flowering Plants

Zoology : Digestion and Absorption

Instructions :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

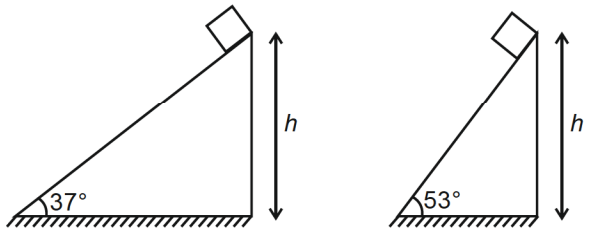
CLICK HERE TO JOIN CHANNEL

PHYSICS

Choose the correct answer:

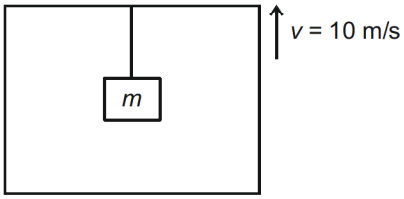
SECTION-A

1. Work done by a force $\vec{F} = (3\hat{i} + 2\hat{j})$ N in displacing a particle from (1 m, 1 m) to (2 m, 3 m) is
   (1) 7 J (2) 70 J
   (3) 12 J (4) 5 J
2. The case in which work done by force would be zero is
   (1) Displacement of point of application of force is zero
   (2) Force and displacement are parallel
   (3) Force is antiparallel to displacement
   (4) All of these
3. SI unit of work is
   (1) joule (2) kWh
   (3) erg (4) horsepower
4. Kinetic energy of a particle may be
   (1) Positive (2) Zero
   (3) Negative (4) Both (1) and (2)
5. Area under force-displacement graph for a body is equal to
   (1) Change in momentum
   (2) Work done by force
   (3) Change in kinetic energy
   (4) Both (2) and (3)
6. Two blocks *A* and *B* of same mass are released from top of two different smooth inclined planes as shown in figure. If the heights of both the inclined planes is same, then the work done by gravity, when both blocks reach the bottom of respective inclines, is



   (1) Same for both blocks
   (2) Greater for block *A*
   (3) Greater for block *B*
   (4) Negative for both blocks
7. Which of the following may be negative in numerical value?
   (1) Gravitational potential energy
   (2) Kinetic energy
   (3) Both (1) and (2)
   (4) Neither (1) nor (2)
8. Energy 2 eV in joule is equal to
   (1) 8.2×10^{-19} J
   (2) 3.2×10^{-19} J
   (3) 1.6×10^{-19} J
   (4) 4.8×10^{19} J
9. An engine lifts 400 kg mass through a height of 100 m in 20 s. The rated power of the engine is, if efficiency of engine is 80% (g = 10 m/s^2)
   (1) 30 kW (2) 20 kW
   (3) 25 kW (4) 10 kW
10. The elastic potential energy stored in a spring, having a compression 10 cm, is 20 J. The potential energy stored in spring, when it is given an extension of 10 cm from its natural length, is
    (1) 40 J (2) 20 J
    (3) 10 J (4) 5 J
11. Two particles *A* and *B* of equal masses having initial velocities $\vec{v_A} = (8\hat{i} + 8\hat{j})$ m/s and $\vec{v_B} = (\hat{i} + \hat{j})$ m/s respectively collide. If the collision is head-on and elastic, then the final velocities of *A* and *B* respectively will be
    (1) $(3\hat{i} + 4\hat{j})$ m/s and $(\hat{i} + \hat{j})$ m/s
    (2) $(\hat{i} + \hat{j})$ m/s and $(7\hat{i} + 7\hat{j})$ m/s
    (3) $(\hat{i} + 2\hat{j})$ m/s and $(2\hat{i} + \hat{j})$ m/s
    (4) $(\hat{i} + \hat{j})$ m/s and $(8\hat{i} + 8\hat{j})$ m/s

12. A block of mass m = 10 kg hangs from ceiling of an elevator, through a string, as shown in the figure. If the lift moves up with a constant speed 10 m/s, then the work done by tension in string on mass m, in 2 s w.r.t. an observer on the ground will be [g = 10 m/s^2]



(1) 1 kJ (2) 3 kJ

(3) 2 kJ (4) 4 kJ

13. Linear momentum of a particle becomes 2 times the initial value. The kinetic energy of the particle increases by a factor of

(1) 1 (2) 2

(3) 3 (4) 4

14. A particle moves along x-axis from origin to x = 2 m, under influence of a force F = (8x) N. The work done in the process is

(1) 16 J (2) 20 J

(3) 9 J (4) 4 J

15. Two particles of different masses are acted upon by equal force. If initially the particles were at rest, then the kinetic energy of both particles would be same after

(1) Same time interval

(2) Same displacement

(3) Both (1) and (2)

(4) Neither (1) nor (2)

16. Coefficient of restitution for perfectly elastic collision is

(1) 1 (2) 0

(3) $\frac{1}{2}$ (4) $\frac{3}{4}$

17. Which of the following is a conservative force?

(1) Gravitational force

(2) Frictional force

(3) Viscous force

(4) Air drag

18. In an inelastic collision

(1) Kinetic energy is conserved during the collision

(2) Linear momentum of system is conserved during the collision

(3) Neither momentum nor kinetic energy is conserved during the collision

(4) Both momentum and kinetic energy are conserved during the collision

19. A force delivering constant power to a particle would mean that the particle will have constant

(1) Kinetic energy

(2) Velocity

(3) Rate of change of kinetic energy

(4) Acceleration

20. Potential energy of a conservative system is given by $U = (x^2 - 9x)$ joule, where x is in meter. The equilibrium position is at x, equal to

(1) 4 m (2) 4.5 m

(3) 9 m (4) 10 m

21. A body is being rotated in a circular path with uniform speed. The work done by centripetal force is

(1) Positive (2) Zero

(3) Negative (4) Infinite

22. The magnitude of component of $\vec{A} = \hat{i} + \hat{j}$ along $\vec{B} = \hat{i}$ is

(1) 1 (2) 2

(3) 3 (4) 4

23. A ball is dropped from a height H = 10 m. After collision, it rebounds to height h = 2.5 m. The coefficient of restitution of collision is

(1) $\frac{1}{2}$ (2) $\frac{1}{4}$

(3) $\frac{1}{3}$ (4) 1

24. Potential energy is defined

(1) Only for conservative forces

(2) Only for non-conservative forces

(3) For both conservative and non conservative

(4) As positive of work done by conservative forces

25. Consider following two statements.

(a) In a collision, the colliding bodies may or not come in real physical touch.

(b) In a collision, mechanical energy is always conserved.

The correct statement is

(1) (a) only

(2) (b) only

(3) (a) and (b) both

(4) Neither (a) nor (b)

26. A force of 20 N act along the direction of motion of a body moving with a speed 5 m/s. The instantaneous power delivered by the force is

(1) 20 W (2) 100 W

(3) 5 W (4) 4 W

27. Dimensional formula of work is

(1) $[M\ L\ T^{-2}]$ (2) $[M^2\ L\ T^{-1}]$

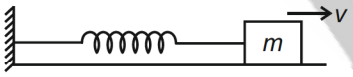
(3) $[M\ L^{-1}\ T^{-2}]$ (4) $[M\ L^2\ T^{-2}]$

28. Graph between elastic potential energy stored in a spring v/s extension in the spring is

(1) Parabola (2) Ellipse

(3) Hyperbola (4) Circle

29. A block of mass m is connected to one end of a spring of spring constant K, whose other end is fixed to a wall, as shown in the figure. If initially the spring is unstretched and block is given an initial velocity v, then the maximum extension in spring will be



(1) $\sqrt{Km}\,v$ (2) $\sqrt{\frac{K}{m}}\,v$

(3) $\sqrt{\frac{m}{K}}\,v$ (4) Kmv

30. For a body falling towards ground in a free fall

(1) Gravitational potential energy decreases

(2) Gravitational potential energy increases

(3) Kinetic energy decreases

(4) Kinetic energy remains constant

31. The dot product of $(\hat{i}+\hat{j})$ and $(2\hat{i}+\hat{j})$ is

(1) 3 (2) 5

(3) 6 (4) 7

32. Work done by friction can be

(1) Positive (2) Negative

(3) Zero (4) All of these

33. Work done by gravity on a particle, if it moves horizontally, near the surface of earth, is

(1) Positive (2) Negative

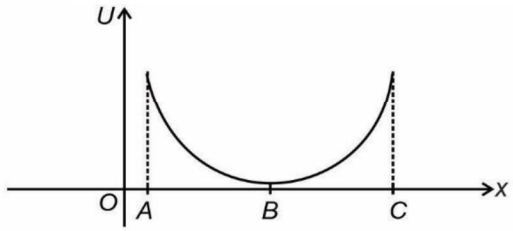
(3) Zero (4) Both (1) and (3)

34. Two particles of masses m and $2m$ respectively have speeds v each. The ratio of their respective kinetic energy is

(1) 2 : 1 (2) 1 : 2

(3) 3 : 1 (4) 1 : 3

35. Variation of potential energy U of a body moving along x-axis varies with position (x) as shown in the figure.



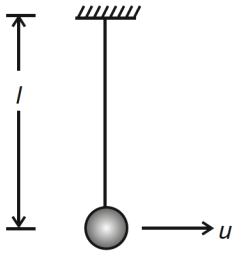
The body is in equilibrium at

(1) A (2) B

(3) C (4) Both A and C

SECTION-B

36. A small bob of mass 2 kg is suspended from an inextensible string as shown in figure. If length of string is l = 5 m and bob is given an initial horizontal velocity u = 10 m/s, then the speed of bob when string is inclined at angle 90° with the vertical will be



(1) 20 m/s (2) 5 m/s

(3) 2 m/s (4) Zero

37. A force is delivering constant power of 20 W to a body. If the force is acting in the direction of the motion, then the magnitude of force, when velocity is 10 m/s, is

(1) 2 N (2) 4 N

(3) 6 N (4) 8 N

38. In perfectly elastic collision between two masses m_1 and m_2 in one dimension, energy transfer is maximum when (m_2 is at rest)

(1) $m_1 = 2m_2$ (2) $m_1 << m_2$

(3) $m_1 >> m_2$ (4) $m_1 = m_2$

39. Force constant of two springs is 200 N/m and 400 N/m. They are stretched by same elongation. The ratio of potential energies stored in the springs is

(1) 1 : 2 (2) 1 : 3

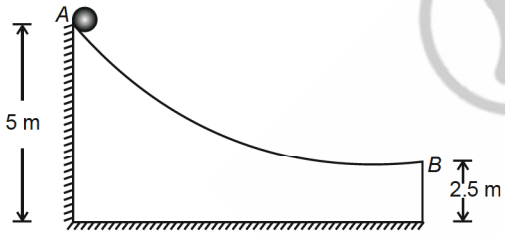
(3) 1 : 1 (4) 2 : 5

40. Potential energy of a particle at position x is given by $U = x^2 - 10x$. Force on the particle at $x = 0$ is (x is in m and F is in N)

(1) 10 N (2) 0 N

(3) 2.5 N (4) 7 N

41. A small bead starts sliding from A on a frictionless wire. On reaching B, the speed of bead will be ($g = 10$ m/s^2).



(1) $3\sqrt{2}$ m/s (2) 5 m/s

(3) $5\sqrt{2}$ m/s (4) 50 m/s

42. $(\alpha\hat{i} + 2\hat{j})$ is perpendicular to $(\hat{i} - \hat{j} + \hat{k})$. The value of α is

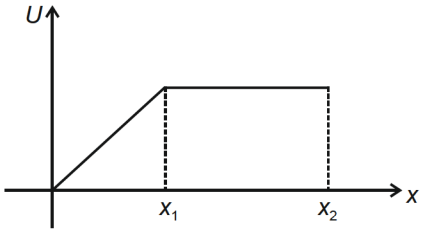
(1) 1

(2) 2

(3) 3

(4) 4

43. Potential energy v/s position graph is as shown in the figure. The corresponding force-position graph is best represented by



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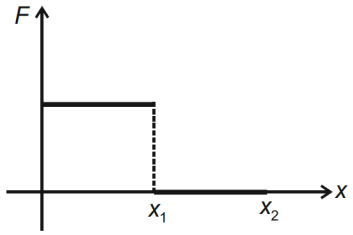

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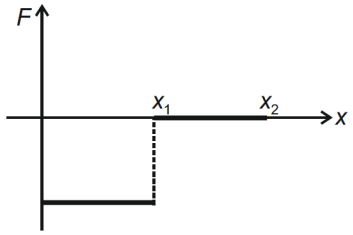

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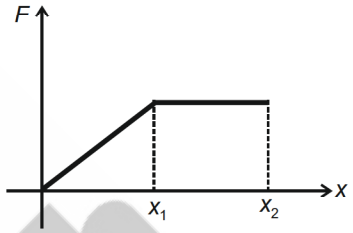

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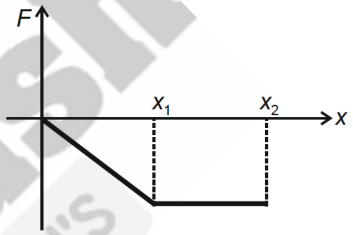


44. A small ball collides with a massive wall, head-on. If the initial speed of ball is 10 m/s and coefficient of restitution is 0.2, then the final speed of ball will be

(1) 4 m/s (2) 1 m/s

(3) 2 m/s (4) Zero

45. If a man speeds up by 1 m/s, his kinetic energy increases by 44%. His original speed in m/s is

(1) 1 (2) 2

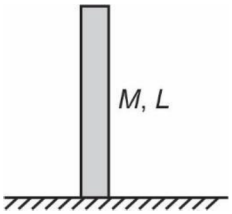
(3) 5 (4) 4

46. Ball is dropped from height h and coefficient of restitution is $\frac{1}{2}$. Find the height achieved by it after second bounce.

(1) $\frac{h}{4}$ (2) $\frac{h}{16}$

(3) $\frac{h}{2}$ (4) $\frac{h}{32}$

47. A uniform rod of mass M and length L is placed on earth as shown in the figure. gravitational potential energy of the rod is



(1) Zero (2) MgL

(3) $\frac{MgL}{3}$ (4) $\frac{MgL}{2}$

48. Force $F=\left(x\hat{i}+y\hat{j}\right)$ acts on a body. Find work done by the force in displacing the object from (1, 2) to (3, 3) in x-y plane. (Consider all quantities in SI units)

(1) $\frac{5}{8}$ J (2) $\frac{5}{2}$ J

(3) $\frac{13}{2}$ J (4) $\frac{6}{2}$ J

49. Particle of mass 2 kg is moving under variable force. Position of particle varies as $x=\frac{t^3}{3}$ where x is in meter and t is in second.

The work done by force in first 2 seconds is

(1) 5 J

(2) 16 J

(3) 10 J

(4) 13 J

50. A force F acting on a body depends on its displacement s as $F \propto s^{-1/3}$. The power delivered by F will depend on displacement as

(1) $s^{2/3}$

(2) $s^{-5/3}$

(3) $s^{1/3}$

(4) s^0

CHEMISTRY

SECTION-A

51. The number of σ bonds and π bonds in butan-2-one respectively are

(1) 8σ and 1π (2) 12σ and 1π

(3) 8σ and 2π (4) 12σ and 2π

52. Which of the following molecules do not follow octet rule?

(1) CH_4 (2) H_2O

(3) NH_3 (4) $AlCl_3$

53. The state of hybridisation of C_1, C_3, C_5 in hydrocarbon $\overset{1}{C}H\equiv\overset{2}{C}-\overset{3}{C}H=\overset{4}{C}H-\overset{5}{C}H_2-\overset{6}{C}H_3$ are respectively

(1) sp^3, sp, sp^2 (2) sp, sp^3, sp^2

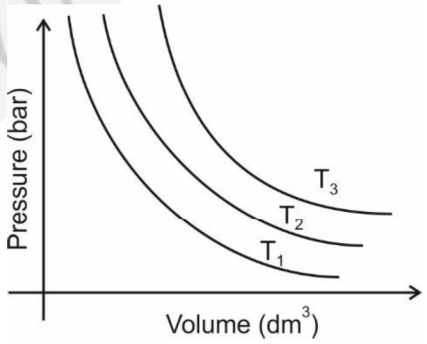
(3) sp, sp^2, sp^3 (4) sp, sp, sp^3

54. Which of the following pair of molecules/ions are isoelectronic and isostructural?

(1) I_3^-, SO_2 (2) NO_3^-, CO_3^{2-}

(3) XeF_4, SF_4 (4) SO_3, ClO_3^-

55. The pressure-volume graph of a given mass of an ideal gas at constant temperature is shown below.



What is the correct order of temperature?

(1) $T_1 > T_2 > T_3$ (2) $T_2 > T_3 > T_1$

(3) $T_3 > T_2 > T_1$ (4) $T_2 > T_1 > T_3$

56. Which of the following molecules is planar?

(1) BF_3 (2) CH_4

(3) PCl_3 (4) NH_3

57. For an ideal gas, at constant pressure, the root mean square velocity is related with density as $v_{rms} \propto d^x$, then the value of x is

(1) 1/2 (2) –1/2

(3) 2 (4) 1

58. Which of the following would have a permanent dipole moment?

(1) CO_2 (2) BF_3

(3) CCl_4 (4) NH_3

59. Correct order of bond length in O_2, O_2^+, O_2^- is

(1) $O_2^+ < O_2 < O_2^-$ (2) $O_2^- < O_2 < O_2^+$

(3) $O_2^- < O_2^+ < O_2$ (4) $O_2 < O_2^+ < O_2^-$

60. Which of the following species is diamagnetic?

(1) O_2 (2) O_2^{2-}

(3) NO (4) N_2^+

61. Which of the following does not exist?

(1) H_2 (2) C_2

(3) He_2 (4) Li_2

62. Density of gas is maximum at

(1) High temperature and low pressure

(2) Low temperature and high pressure

(3) Low temperature and low pressure

(4) High temperature and high pressure

63. Total number of 90° bond angles present in PCl_5 molecule is

(1) 2 (2) 3

(3) 5 (4) 6

64. The bond order of N_2 is the same as in

(1) CO (2) N_2^+

(3) NO (4) F_2

65. If the ratio of masses of N_2 and O_2 gases confined in a vessel is 2 : 1, then the ratio of their partial pressures will be

(1) 8 : 7 (2) 7 : 8

(3) 3 : 4 (4) 16 : 7

66. An example of odd electron molecule is

(1) SO_3 (2) CO_2

(3) NO_2 (4) Cl_2O_7

67. According to MOT, C_2 molecule has

(1) One σ and one π bond

(2) Only two π bonds

(3) Only two σ bonds

(4) One σ and two π bonds

68. Match the compounds given in column I with their structures given in column II and assign the correct code.

	Column I		Column II
a.	ClF_3	(i)	Pyramidal
b.	SF_6	(ii)	Bent T-shape
c.	XeF_4	(iii)	Octahedral
d.	XeO_3	(iv)	Square planar

	a	b	c	d
(1)	(i)	(iii)	(ii)	(iv)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iv)	(iii)	(ii)	(i)

69. The *d*-orbital involved in the hybridisation in PCl_5 molecule is

(1) $3d_{z^2}$

(2) $4d_{x^2-y^2}$

(3) $3d_{xy}$

(4) $3d_{x^2-y^2}$

70. Which of the following statement is incorrect regarding hybridisation?

(1) The number of hybrid orbitals are always less than the number of atomic orbitals that get hybridised

(2) The hybridised orbitals are always equivalent in energy and shape

(3) All sp^3 hybrid orbitals are at 109°28′ to one another

(4) sp^3d^2 hybrid orbitals are directed towards the corners of a regular octahedron

71. The incorrect statement among the following is

(1) Bonding molecular orbitals possess less energy than combining atomic orbitals

(2) Antibonding orbitals are denoted by σ^*, π^*

(3) Molecular orbital formed by the addition overlap of atomic orbitals is called antibonding molecular orbitals

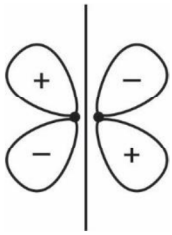
(4) Bonding molecular orbital contributes towards the stability of molecule

72. The ratio of most probable speed (c*), average speed ($\bar{c}$) and root mean square speed (c) of a gas is

(1) $\sqrt{2}:\sqrt{3}:\sqrt{\frac{8}{\pi}}$ (2) $\sqrt{3}:\sqrt{2}:\sqrt{\frac{8}{\pi}}$

(3) $\sqrt{2}:\sqrt{\frac{8}{\pi}}:\sqrt{3}$ (4) $\sqrt{\frac{8}{\pi}}:\sqrt{2}:\sqrt{3}$

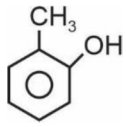
73. Which of the following molecular orbital is represented below?

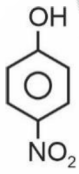


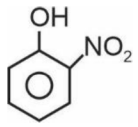
(1) π^* orbital (2) π orbital

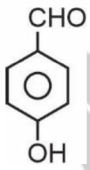
(3) σ orbital (4) σ^* orbital

74. Intramolecular hydrogen bonding is present in

(1) 

(2) 

(3) 

(4) 

75. If the ratio of densities of two gases X and Y is 1 : 9, then the ratio of their rates of diffusion under similar conditions of temperature and pressure is

(1) 3 : 1 (2) 1 : 3

(3) 9 : 1 (4) 1 : 9

76. The unit of van der Waals constant a is

(1) $L^2\ mol^{-1}\ atm^{-1}$ (2) atm L mol^{-2}

(3) $atm^{-1}\ L^{-2}\ mol^2$ (4) atm $L^2\ mol^{-2}$

77. In a homonuclear molecule, which of the following sets of orbitals are degenerate?

(1) $\sigma 1s$ and $\sigma 2s$ (2) $\pi 2p_x$ and $\pi 2p_y$

(3) $\pi 2p_x$ and $\sigma 2p_z$ (4) $\sigma 2p_z$ and $\sigma^* 2p_z$

78. The relationship between critical pressure and van der Waals constants is

(1) $P_C = \frac{27b^2}{a}$ (2) $P_C = 3b$

(3) $P_C = \frac{8a}{27Rb}$ (4) $P_C = \frac{a}{27b^2}$

79. In which of the following molecule, the bond angle is maximum?

(1) NH_3 (2) CH_4

(3) SO_2 (4) CS_2

80. The most covalent compound is

(1) LiI (2) LiCl

(3) LiBr (4) LiF

81. The only force present among He atoms is

(1) Ionic bonds

(2) van der Waals forces

(3) Covalent bonds

(4) Metallic bonds

82. An atom of an element X has two electrons in its outermost orbit and that of Y has five electrons in its outermost orbit. The formula of the compound will be

(1) X_2Y_3 (2) X_3Y_2

(3) X_2Y_5 (4) X_5Y_2

83. On increasing temperature, viscosity of a liquid will

(1) Increase

(2) Decrease

(3) Increase initially then decrease

(4) Remain same

84. If a gas is two times compressible than that of ideal gas then the value of compressibility factor for the gas is

(1) $Z = \frac{1}{2}$ (2) Z = 1

(3) Z = 2 (4) Z = 4

85. Which of the following forces is responsible to hold two ice cubes together when pressed over each other?

(1) Hydrogen bonding

(2) Dipole-dipole interaction

(3) Covalent bonds

(4) London-dispersion force

SECTION-B

86. Which of the following molecules has both polar and non-polar bonds?
(1) H_2SO_4 (2) N_2H_4
(3) SO_3 (4) NO_2

87. Which is the incorrect statement regarding PCl_5?
(1) In PCl_5, the hybridisation of P is sp^3d
(2) There are two types of bonds; axial bonds and equatorial bonds
(3) Axial bonds are stronger than equatorial bonds
(4) Geometry of PCl_5 is trigonal bipyramidal

88. The type of interaction present between the HCl molecules are
(1) Dipole-induced dipole forces
(2) Dipole-dipole interaction
(3) Instantaneous dipole-induced dipole interaction
(4) Ion-induced dipole interaction

89. A real gas behaves like an ideal gas under conditions of
(1) High pressure and high temperature
(2) Low pressure and high temperature
(3) Low pressure and low temperature
(4) High pressure and low temperature

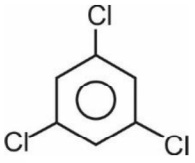
90. Compare the bond dissociation enthalpies of the following species : H_2, H_2^+ and H_2^-
(1) $H_2 < H_2^+ < H_2^-$ (2) $H_2^+ < H_2 < H_2^-$
(3) $H_2^+ < H_2^- < H_2$ (4) $H_2^- < H_2^+ < H_2$

91. Select the incorrect statement about resonance
(1) The resonating structures are hypothetical
(2) The number of unpaired electrons in various resonating structures remain same
(3) Hybrid structure is least stable
(4) Resonance involves delocalization of π - electrons

92. The correct order of strength of the bonds formed by the overlapping of 2*s*-2*s*, 2*s*-2*p* and 2*p*-2*p* are
(1) 2*s*-2*p* > 2*s*-2*s* > 2*p*-2*p*
(2) 2*s*-2*s* > 2*p*-2*p* > 2*s*-2*p*
(3) 2*p*-2*p* > 2*s*-2*p* > 2*s*-2*s*
(4) 2*p*-2*p* > 2*s*-2*s* > 2*s*-2*p*

93. Surface tension of a liquid is maximum for
(1) C_2H_5OH (2) H_2O
(3) $C_2H_5 - O - C_2H_5$ (4) C_6H_{14}

94. At constant pressure, the volume of the gas changes from 150 L to 200 L. If the initial temperature is 27°C, then the final temperature will be
(1) 400 K (2) 293 K
(3) 340 K (4) 283 K

95. Molecule having highest dipole moment is
(1) 
(2) 
(3) 
(4) 

96. In which of the following transitions, bond order increases but magnetic nature does not change?
(1) $N_2^+ \rightarrow N_2$ (2) $N_2 \rightarrow N_2^+$
(3) $O_2 \rightarrow O_2^{\oplus}$ (4) $N_2 \rightarrow N_2^-$

97. In which of the following molecule, all bonds are identicals?
(1) PCl_5 (2) SF_4
(3) ICl_3 (4) XeF_4

98. Maximum number of co-planar atoms in ethene molecules is
(1) 3 (2) 4
(3) 5 (4) 6

99. A gaseous mixture contains equal mass of H_2 and SO_2. If total pressure of the mixture is 11 atm then partial pressure of SO_2 is
(1) 1 atm (2) $\frac{1}{3}$atm
(3) $\frac{2}{9}$atm (4) $\frac{10}{3}$atm

100. If compressibility factor of a real gas at STP is 2 then volume taken by 2 mol gas at STP will be
(1) 11.2 L (2) 22.4 L
(3) 44.8 L (4) 89.6 L

BOTANY

SECTION-A

101. According to Linnaeus's two kingdom classification, organisms like *Chlamydomonas* and *Chlorella* should be placed under
(1) Kingdom Protista (2) Kingdom Plantae
(3) Kingdom Animalia (4) Kingdom Monera

102. Methanogens differ from thermoacidophiles in
(1) Being chemoautotrophs
(2) Being present in gut of ruminants
(3) Being archaebacteria
(4) Having introns in their genetic material

103. All bacteria lack
(1) Cell wall (2) Plasma membrane
(3) Well defined nucleus (4) Flagella

104. According to two-kingdom classification system, members of kingdom Animalia lack
(1) Contractile system (2) Response to stimuli
(3) Locomotion (4) Cell wall

105. Select the **correct** match.
(1) *Acetobacter aceti* – Curd production
(2) *Frankia* – Symbiotic N_2-fixation
(3) *Pseudomonas putida* – Vinegar production
(4) *Azotobacter* – Cheese production

106. A sterile stamen is called
(1) Staminate (2) Pistillate
(3) Receptacle (4) Staminode

107. Drupe fruit of mango
(1) Has fibrous mesocarp
(2) Develops from monocarpellary ovary
(3) Has stony epicarp
(4) Does not have well differentiated pericarp

108. State true **(T)** or false **(F)** for given statements and select the **correct** option.
(a) A carpel consists of three parts which are stigma, style and ovary.
(b) In *Salvia*, there is variation in the length of filaments within the flower.
(c) All dicot seeds lack seed coat.

	(a)	(b)	(c)
(1)	T	T	T
(2)	T	T	F
(3)	T	F	T
(4)	F	T	T

109. The tap roots of carrot modify for the purpose of
(1) Mechanical support
(2) Storage of food
(3) Respiration
(4) Vegetative propagation

110. Organism which shows mixotrophic nutrition is
(1) *Noctiluca* (2) *Euglena*
(3) *Physarum* (4) *Gonyaulax*

111. Which of the following statements is **incorrect** regarding heterocyst cells?
(1) Occurrence of nitrogen fixation
(2) Presence of thick cell wall
(3) Absence of CO_2 fixation
(4) Absence of PS I

112. Bacteria reproduce mainly by
(1) Spores production
(2) Sexual reproduction
(3) Fission
(4) Both (1) and (2)

113. Spores of slime moulds
(1) Always diploid
(2) Have cellulosic cell wall
(3) Are dispersed mainly by water currents
(4) Cannot survive under adverse conditions

114. Medicinal plant of family Fabaceae is
(1) *Ashwagandha* (2) Belladonna
(3) Muliathi (4) *Aloe*

115. Which of the following is **incorrect** w.r.t. dinoflagellates?
(1) Mostly marine and photosynthetic
(2) Most of them have two flagella
(3) Lack membrane bound cell organelles
(4) Release toxins

116. Apocarpous ovary is present in
(1) Tomato (2) Lotus
(3) Mustard (4) Potato

117. Edible sac fungi are
(1) *Aspergillus* (2) *Agaricus*
(3) *Morels* (4) *Penicillium*

118. All the given features are common between the members of Ascomycetes and Deuteromycetes, **except**
(1) Septate and branched mycelium
(2) Formation of conidia
(3) Can be decomposers
(4) Production of sexual spores

119. Which of the following is **correct** for TMV?
(1) DNA as genetic material
(2) Helical arrangement of capsomeres
(3) Presence of envelope around the protein coat
(4) It does not infect plants

120. Who showed that viruses could be crystallised?
(1) Pasteur (2) Ivanowsky
(3) Beijerinck (4) Stanley

121. Viroids
(1) Are larger than viruses
(2) Have protein coat
(3) Cause potato spindle tuber disease
(4) Are high molecular weight RNA

122. Prions are infectious _____ molecules.
(1) dsDNA (2) ssDNA
(3) RNA (4) Protein

123. Read the following statements and select the **correct** option.

Statement A : Lichens grow well in SO_2 polluted area.

Statement B : Lichens are mutual association between algae and fungi.

(1) Only A is incorrect
(2) Only B is incorrect
(3) Both A and B are correct
(4) Both A and B are incorrect

124. Supporting stilt roots arise from the lower nodes of stem are found in
(1) Sweet potato (2) Maize
(3) *Rhizophora* (4) Turnip

125. In roots, the root hairs are formed from the epidermal cells of the
(1) Root cap
(2) Region of meristematic activity
(3) Region of elongation
(4) Region of maturation

126. Axillary buds develop into tendrils in all the following plants**, except**
(1) *Citrus* (2) Pumpkin
(3) Water melon (4) Cucumber

127. Select the **mismatched** pair.
(1) Jasmine – Stolon
(2) *Eichhornia* – Offset
(3) *Chrysanthemum* – Runner
(4) *Opuntia* – Phylloclade

128. How many of the following features is/are associated with china rose plant?
(a) Alternate phyllotaxy
(b) Monoadelphous stamens
(c) Valvate aestivation in corolla
(d) Axile placentation
(1) Two (2) Three
(3) Four (4) One

129. Cylindrical stalk of leaf that holds the leaf blade to sunlight is
(1) Midrib (2) Pulvinus
(3) Rachis (4) Petiole

130. Leaf tendrils
(1) Are present in Australian *Acacia*
(2) Are modification for the purpose of defence
(3) Are short lived structures
(4) Help the stem in climbing

131. Arrangement of veins and veinlets in leaf lamina is called
(1) Venation (2) Phyllotaxy
(3) Aestivation (4) Placentation

132. Hypogynous flowers have/show
(1) Half inferior ovary
(2) Floral parts situated at the rim of thalamus above the ovary
(3) Gynoecium occupying the highest position
(4) Thalamus enclosing the ovary completely

133. Match the following columns and select the **correct** option.

	Column I		Column II
a.	Epipetalous stamens	(i)	Lily
b.	Vexillary aestivation	(ii)	Brinjal
c.	Parietal placentation	(iii)	Pea
d.	Epiphyllous stamens	(iv)	Mustard

(1) a(ii), b(iii), c(iv), d(i) (2) a(i), b(iii), c(iv), d(ii)
(3) a(ii), b(iv), c(iii), d(i) (4) a(i), b(iv), c(iii), d(ii)

134. Actinomorphic flowers are present in
(1) *Cassia* (2) Gulmohur
(3) *Canna* (4) *Datura*

135. Non-endospermous seeds
(1) Always have embryo with two cotyledons
(2) Are not produced by double fertilisation
(3) Are found in orchid and gram
(4) Have triploid nutritive tissue even at maturity

SECTION-B

136. A cyanobacteria cultivated in tanks as a source of protein rich food (SCP) is
(1) *Nostoc* (2) *Spirulina*
(3) *Trichodesmium* (4) *Microcystis*

137. Organisms that are smallest living cells known
(1) Have cellulosic cell wall
(2) Are pleomorphic
(3) Have ssRNA as genetic material
(4) Are autotrophic organisms

138. Sleeping sickness is caused by
(1) *Paramoecium* (2) *Amoeba*
(3) *Entamoeba* (4) *Trypanosoma*

139. How many of the following kingdoms have saprophytic organisms according to five kingdom classification system?
(1) Two (2) Three
(3) Four (4) Five

140. Select the **odd** one w.r.t. plant containing edible underground stem.
(1) Potato (2) Ginger
(3) *Colocasia* (4) Grass

141. In maize seed, single large and shield shaped cotyledon is known as
(1) Coleoptile (2) Coleorhiza
(3) Scutellum (4) Hilum

142. Find the **incorrect** statement regarding cymose inflorescence.
(1) Main axis has limited growth
(2) Flowers are borne in acropetal order
(3) Main axis terminates in a flower
(4) It is found in *Bougainvillea* plant

143. Which of the following features are **correct** for plants of family Solanaceae?
(a) Flower with bilateral symmetry
(b) Exstipulate leaves
(c) Swollen placenta with many ovules
(d) Non-endospermous seeds
(1) (a) and (b) (2) (c) and (d)
(3) (a) and (d) (4) (b) and (c)

144. Which of the following fungi is a parasite on mustard plant and cause white rust?
(1) *Albugo* (2) *Rhizopus*
(3) *Mucor* (4) *Aspergillus*

145. Read the following statements and select the **correct** option.
Statement A : Soyabean plant has papilionaceous corolla.
Statement B : In plants like tomato, endosperm is covered by a proteinaceous layer called aleurone layer.
(1) Only A is correct
(2) Only B is correct
(3) Both A and B are correct
(4) Both A and B are incorrect

146. The mycelium of phycomycetes is
(1) Coenocytic and uninucleate
(2) Aseptate and multinucleate
(3) Septate and branched
(4) Dikaryotic

147. Opposite phyllotaxy is found in
(1) Sunflower
(2) *Alstonia*
(3) Mustard
(4) Guava

148. In a perigynous flower, the ovary is said to be
(1) Inferior
(2) Superior
(3) Half inferior
(4) Absent

149. All of the following have basidiocarps, **except**
(1) *Neurospora* (2) Bracket fungi
(3) Puffball (4) *Agaricus*

150. Which of the following is **incorrect** for diatoms?
(1) Walls are embedded with silica
(2) Cause red tide in the sea
(3) They are responsible for the formation of diatomaceous earth
(4) Chief producers in the oceans

ZOOLOGY

SECTION-A

151. Component of food which is required in small quantities is
(1) Carbohydrates (2) Proteins
(3) Vitamins (4) Fats

152. A process of conversion of complex food substances to simple absorbable forms is called
(1) Nutrition (2) Digestion
(3) Deglutition (4) Defaecation

153. Which of the following can be absorbed without digestion?
(1) Calcium (2) Butter
(3) Starch (4) Cellulose

154. The posterior end of the human alimentary canal that opens to the outside is named as:
(1) Colon (2) Mouth
(3) Caecum (4) Anus

155. Which shape does the duodenal portion of human small intestine resemble?
(1) U (2) C
(3) J (4) L

156. The hard surface of human teeth that assists in mastication of food, is made up of
(1) Epiglottis (2) Frenulum
(3) Papillae (4) Enamel

157. The opening of the stomach into the duodenum is guarded by a
(1) Cardiac sphincter
(2) Pyloric sphincter
(3) Ileo-caecal valve
(4) Gastro-oesophageal sphincter

158. The number of permanent teeth in a 32 years old adult is
(1) 20 (2) 34
(3) 32 (4) 16

159. Physiologic value of proteins is
(1) Equal to physiologic value of fats
(2) More than gross calorific value of proteins
(3) Less than gross calorific value of carbohydrates
(4) More than gross calorific value of fats

160. The long coiled middle part of small intestine in man is called
(1) Ileum (2) Colon
(3) Jejunum (4) Duodenum

161. Human teeth **cannot** be described as
(1) Homodont (2) Heterodont
(3) Thecodont (4) Diphyodont

162. Digestive disorder in which faeces are retained within the colon as the bowel movements occur irregularly is
(1) Vomiting (2) Diarrhoea
(3) Constipation (4) Indigestion

163. 'It' results from the replacement of mother's milk by a high calorie-low protein diet in a child of more than one year in age. 'It' stands for
(1) Marasmus (2) Kwashiorkar
(3) Obesity (4) Overnutrition

164. Absorption of alcohol initially occurs in which part of the alimentary canal?
(1) Caecum (2) Duodenum
(3) Jejunum (4) Stomach

165. Select the **mismatch** w.r.t. secretion of the corresponding cell type.
(1) Goblet cells - Mucus
(2) Oxyntic cells - HCl
(3) Peptic cells - Trypsin
(4) Parietal cells - Intrinsic factor

166. Category of proteolytic enzyme is **not** represented by
(1) Pepsin (2) Rennin
(3) Trypsin (4) Lactase

167. Percentage of starch digested into maltose by amylase in buccal cavity of man is
(1) 70 (2) 60
(3) 30 (4) 50

168. Enzyme that works optimally at pH 7.8 is
(1) Pepsin (2) Rennin
(3) Salivary amylase (4) Nucleotidase

169. Which of the following is not present in succus entericus?
(1) Mucus (2) Dipeptidase
(3) Disaccharidase (4) Rennin

170. Inactive enzymes present in pancreatic juice include all, **except**
(1) Pepsinogen
(2) Trypsinogen
(3) Chymotrypsinogen
(4) Procarboxypeptidase

171. Select the option indicating the **correct** match.

	Column I		**Column II**
a.	Papillae	(i)	Opening of wind pipe
b.	Glottis	(ii)	Caecum
c.	Vermiform appendix	(iii)	Large intestine
d.	Rectum	(iv)	Taste buds

	(i)	(ii)	(iii)	(iv)
(1)	a	b	c	d
(2)	b	c	a	d
(3)	b	c	d	a
(4)	b	a	d	c

172. A layer of alimentary canal where Brunner's glands are located, is
(1) Submucosa (2) Mucosa
(3) Serosa (4) Muscularis

173. The duct of the gall bladder is called
(1) Common hepatic duct
(2) Common bile duct
(3) Cystic duct
(4) Hepato-pancreatic duct

174. Largest gland of the human body among the following is
(1) Pancreas (2) Parotid
(3) Liver (4) Sublingual

175. Structure(s) responsible for giving brush border appearance to intestinal mucosa is/are
(1) Lacteals (2) Rugae
(3) Crypts of Lieberkuhn (4) Microvilli

176. Read the given statements.

Statement-A : Salivary glands are situated just inside the buccal cavity and secrete salivary juice.

Statement-B : An antibacterial agent is a common component in saliva and succus entericus.

(1) Only statement B is correct
(2) Only statement A is correct
(3) Both statements A and B are correct
(4) Both statements A and B are incorrect

177. Glisson's capsule is associated with mammalian
(1) Pancreas (2) Gall bladder
(3) Liver (4) Salivary glands

178. Select the **correct** match between enzyme listed in column A and its substrate in column B.

	Column A		**Column B**
(1)	Nucleases	–	Nucleotides
(2)	Trypsin	–	Peptones
(3)	Chymotrypsin	–	Trypsinogen
(4)	Dipeptidase	–	Amino acids

179. Choose the **incorrect** statement.

(1) Lacteals in villi help in transport of protein coated fat globules.

(2) Certain drugs when placed under the lower side of the tongue are absorbed into blood capillaries lining it.

(3) Absorption of water occurs through facilitated diffusion in alimentary canal.

(4) Monosaccharides like glucose can be absorbed by simple diffusion and active transport.

180. All of the given are true for large intestine, **except**

(1) Significant digestive activity occurs here

(2) Absorption of some water, minerals and drugs

(3) Secretion of mucus which helps in adhering the undigested particles together

(4) Faeces are temporarily stored in one of its part

181. Anatomical region of stomach that receives food from oesophagus is

(1) Body (2) Cardiac

(3) Fundus (4) Pylorus

182. Rugae are associated with mucosal layer of which part of human alimentary canal?

(1) Small intestine (2) Large intestine

(3) Stomach (4) Rectum

183. Mammalian liver is divided into how many lobes?

(1) Five (2) Four

(3) Three (4) Two

184. Bile is stored and concentrated in a thin, muscular sac called

(1) Parotid gland (2) Liver

(3) Pancreas (4) Gall bladder

185. The exocrine secretions of pancreatic juice **exclude**

(1) Nucleases

(2) Lipases

(3) Insulin

(4) Amylase

SECTION-B

186. Sphincter of Oddi is associated with the opening of

(1) Cystic duct

(2) Common hepatic duct

(3) Hepato pancreatic duct

(4) Common bile duct

187. Upon observing a transverse section of human gut, the outermost layer of alimentary canal

(1) Is formed of smooth muscles

(2) Is made up of thin mesothelium

(3) Has gastric glands

(4) Comprise loose connective tissue only

188. A layer of oblique, non striated muscles are associated with

(1) Oesophagus (2) Stomach

(3) Small intestine (4) Large intestine

189. Hydrolysis of maltose occurs due to enzyme secreted by

(1) Pancreas (2) Liver

(3) Stomach (4) Duodenum

190. Select the **correct** match.

	Food (Substrate)		**Enzyme**
(1)	Milk protein	–	Rennin
(2)	Sucrose	–	Amylase
(3)	Spinach	–	Lipase
(4)	Boiled egg white	–	Maltase

191. Choose the **odd** one w.r.t. enzyme active at alkaline pH.

(1) Salivary amylase (2) Dipeptidase

(3) Lactase (4) Sucrase

192. Action of which proteolytic enzyme gives amino acids?

(1) Pepsin (2) Trypsin

(3) Rennin (4) Dipeptidase

193. Component missing in bile juice but present in hepato-pancreatic duct is

(1) Lipase (2) Biliverdin

(3) Bile salts (4) Phospholipids

194. Protection of gastric mucosa from excoriation from HCl is provided by

(1) Pepsinogen

(2) Pepsin

(3) Rennin

(4) Mucus

195. Maximum absorption of digested nutrients occurs in

(1) Large intestine

(2) Small intestine

(3) Buccal cavity

(4) Oesophagus

196. Read the given statements and select the **incorrect** one.

(1) Extensive oedema and swelling of body parts are exclusive features of marasmus.

(2) The bile, pancreatic juice and the intestinal juice are the secretions released into the small intestine.

(3) The chemical process of digestion is initiated in the oral cavity.

(4) The final steps in digestion occur very close to the mucosal epithelial cells of the intestine.

197. Select the **correct** cell whose secretions form acidic environment in stomach.

(1) Mucus neck cells (2) Peptic cells

(3) Chief cells (4) Parietal cells

198. Match column-I with column-II and choose the **correct** option.

	Column-I		Column-II
a.	Parotid gland	(i)	Below diaphragm
b.	Sub-maxillary gland	(ii)	Below tongue
c.	Sub-lingual gland	(iii)	Lower jaw
d.	Liver	(iv)	Cheek

(1) a(i), b(ii), c(iii), d(iv)

(2) a(iii), b(i), c(ii), d(iv)

(3) a(iv), b(ii), c(iii), d(i)

(4) a(iv), b(iii), c(ii), d(i)

199. Which of the following is a common feature between gastric juice, intestinal juice and pancreatic juice?

(1) pH and temperature

(2) Presence of nucleic acid digesting enzyme

(3) Presence of bile pigments

(4) Presence of lipase

200. Mixture of food with saliva is called _____ whereas mixture of food with gastric juice is called _____.

Select the **correct** option that fills the blanks respectively.

(1) Chyme, bolus (2) Chyme, chyle

(3) Bolus, chyle (4) Bolus, chyme

❑ ❑ ❑